2. Connect the RJ-11C (telco) connector of the 01-80358A52 Interface Cable to the appropriate connector on the Radius R100 repeater:

Desired Codeplug	R100 Jack
Receiver	J8 - RX PROG
Transmitter	J9 - TX PROG

3. Apply AC power to the Repeater.

How the Screens are Organized

The Radius R100 Radio Service Software is a user friendly menu-driven program. The structure of the menu tree is shown in Figure 1.2.

A branch in the diagram is represented by a menu choice in the program. Each box represents a menu. You may "walk through" this menu tree by entering special characters. To progress down through the tree, a numeric digit or <Enter> key is used. The next higher level menu is reached by pressing the <ESC> key.

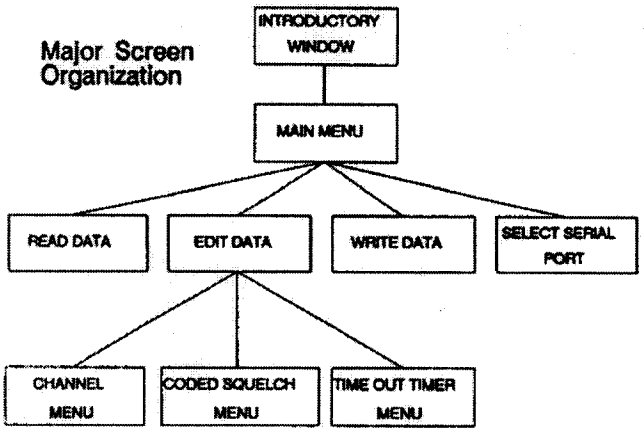

Figure 1.2

Software Installation

In order to use the Radio Service Software it first must be installed on your IBM PC.

If you have only floppy disk drives first load PCDOS or MSDOS into the computer. If you are not familiar with this procedure please refer to your DOS manual. Next, you want to make a working copy of the Radio Service Software. Insert a blank formatted disk in drive A: and the supplied copy of the Radio Service Software in drive B:. Then you should type:

COPY B:*.* A:<- ("<-" Represents the Enter Key)

to transfer the Radio Service Software to your working disk. Remove the supplied copy of the Radio Service Software and keep it in a safe place. This will insure that you will always have an uncorrupted copy available should anything happen to your working disk.

If you have a hard disk drive, you may first want to create a sub-directory for your Radio Service Software. If you are not familiar with using sub-directories please refer to your DOS manual and Appendix F of this manual.

Put the supplied copy of the Radio Service Software in drive A:. Log onto drive C: by typing:

C:<-

Select the desired sub-directory by typing:

CD <path> <-

An example of the "CD" command with a path would be:

CD \MRSS\R100

This would put you in the sub-directory "R100".

To copy the Radio Service Software to hard disk drive now type:

COPY A:*.* <-

Remove the supplied copy of the Radio Service Software and keep it in a safe place. This will insure that you will always have an uncorrupted copy available should anything happen to your hard disk drive.

Starting the Radio Service Software

After setting up the station and computer as described in "Configuring the Repeater and Computer", type in the program name, R100, followed by the <Enter> key. The introductory window should be displayed (Figure 1.3):

NOTE:

The Num Lock and Caps Lock keys must be activated for the program to operate properly. The program does not recognize the cursor arrows on the numeric pad, but does interpret the number on the arrow key as that arrow (i.e. an 8 is interpreted as a cursor up- arrow key).

```
RADIUS R100 FIELD PROGRAMMER V1.9
(c) COPYRIGHT MOTOROLA, INC. 1985,1988

Standard Version                Date: 01/15/88

PRESS ANY KEY TO CONTINUE
```

Figure 1.3

This window provides title and copyright information. The software version number and date of last change are also displayed. Press any key to proceed to the Main Menu.

Main Menu

The first line of the Main Menu (Figure 1.4) identifies the field programmer and software version number. This example shows software version 1.9. The diagram above also outlines two other fields. The "Data-type Window" shows the current status of the codeplug data stored in the programmer's buffer. There are three possible data-type messages:

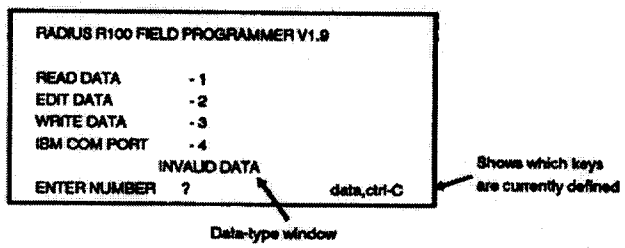

Figure 1.4

INVALID DATA -- The codeplug data read by the programmer is either invalid or no data was read (read attempt failed). Normally appears when the Field Programmer is first invoked.

RECEIVER -- The codeplug data in the programmer is a valid receiver codeplug image.

TRANSMITTER -- The codeplug data in the programmer is a valid transmitter codeplug image.

The second area of the main menu display is located in the lower- right corner. This window is present in all menu and submenu displays. Here, the functional keys are defined for the current menu. In this example, only "data" keys (data means numeric data, or digits 1- 4) and the CTRL-C key combination are defined in the main menu. To select a function (READ DATA, EDIT DATA, WRITE DATA, or IBM COM PORT), enter the corresponding number (1- 4). To exit the Field Programmer and return to DOS, press the "C" key while holding down the CTRL key.

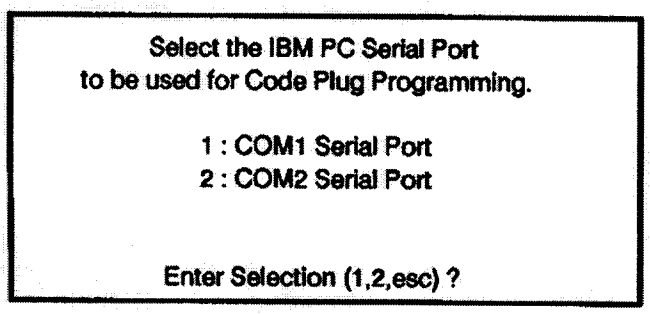
Select the IBM PC Serial Port
to be used for Code Plug Programming.
1 : COM1 Serial Port
2 : COM2 Serial Port
Enter Selection (1,2,esc) ?

Figure 1.5

IBM COM Port Menu

This menu is used to select the serial port the programmer will use to interface to the repeater. To enter this menu from the Main Menu, press the "4" key. The IBM COM Port Menu will be displayed (Figure 1.5).

The highlighted selection indicates which serial port is currently selected. The two available choices are COM1 and COM2. The default selection is COM1. To change the serial port selection, enter "1" for COM1 or "2" for COM2. To return to the Main Menu without changing the serial port selection, press the key. This menu need not be entered unless COM2 is used for codeplug programming.

Part 2 Loading and Saving Codeplug Information

Recommended Programming Procedure

When reprogramming the R100 Repeater, the following procedure is recommended:

1. Install the interface cable at TX PROG jack (J9) on the R100 repeater.
2. READ the codeplug from the repeater.
3. EDIT the codeplug stored in the programmer buffer.
4. WRITE the programmer buffer back to the codeplug.
5. Move the interface cable to the RX PROG jack (J8) and repeat steps 2-4.

NOTE:

If the interface cable is connected to COM2 of the computer, select IBM COM PORT (selection 4) on the Main Menu and change the setting to COM 2 serial port.

It is not necessary to program the transmitter codeplug before programming the receiver codeplug.

Reading the Repeater Codeplug

Power up the repeater and connect the programmer interface cable as described in Part 1.

While at the Main Menu level, press "1" to transfer the codeplug from the repeater to the programmer. After a successful codeplug transfer, the display shows the "Codeplug type identification" field indicating which codeplug was just read in. In the Figure 2.1, a receiver codeplug was successfully read into the programmer. If no error occurs, then two beeps will be sounded. Refer to Appendix D for a listing of error messages and their meaning.

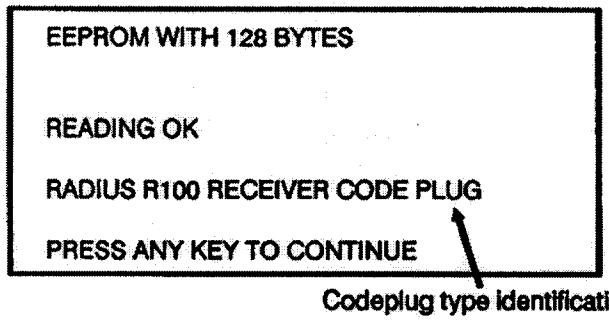

Figure 2.1

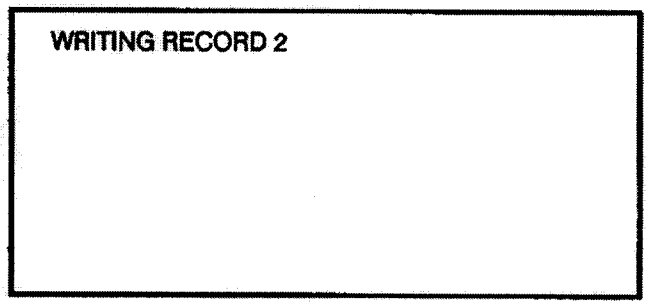

Figure 2.2

Writing to the Repeater Codeplug

Press "3" while in the Main Menu to program the repeater codeplug from the codeplug image stored in the programmer's internal buffer. This menu can not be invoked unless a valid codeplug has already been read (i.e. the data type window on the Main Menu must not show "INVALID DATA"). During programming, the display will be as in Figure 2.2. The Record number is the number of the 64-byte record currently being transferred to the repeater. After each record is transferred, it is read back again to verify proper programming. After successful programming, the display will be as in Figure 2.3. For a listing of possible error messages, see Appendix D.

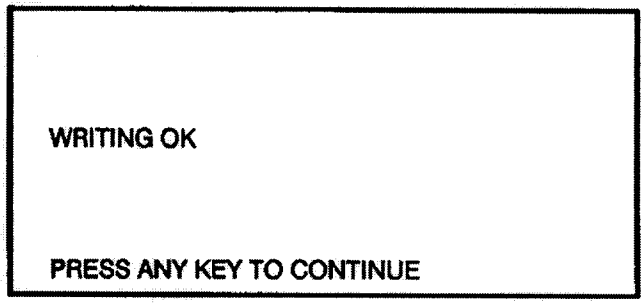

Figure 2.3

Part 3 Changing the Repeater's Codeplug Information

Edit Menu

While in the Main Menu, the Edit Menu is entered by pressing "2". In the Edit Menu, all programmable station parameters may be viewed and/or edited. The Edit Menu can only be entered if the codeplug has been successfully read into the programmer's buffer. To exit the Edit Mode and return to the Main Menu, simply press the <ESC> key.

As in the Main Menu, the lower right corner of the display shows which keys/inputs are defined in this menu. The valid keys for the Edit Menu are as follows:

Key	Function
<ESC>	Return to the Main Menu.
4 (left arrow)	Scroll Edit Menu backward.
6 (right arrow)	Scroll Edit Menu forward.
8 (up arrow)	Move cursor symbol up within menu block.
2 (down arrow)	Move cursor symbol down within menu block.
<Enter>	Select option next to cursor symbol or terminate data entry.
L	List all programmed options to the display or printer.
F	Select special function.

The edit menu is divided into three major submenus of related options: 1) Channel Selection Menu, 2) Coded Squelch Menu, and, 3)Time-Out-Timer Menu. Upon selecting the Edit Menu, the Channel Selection Menu is entered. To move from submenu to submenu, press the left or right arrow keys ("4" for left, "6" for right). For each submenu, all options within that submenu are listed, one per line. The highlighted option is the option that is currently programmed in the codeplug. To change options, use the up or down arrow keys ("8" for up, "2" for down) to position the cursor symbol "< >" next to the desired option. Then press <Enter>. Each submenu will be described in detail in the following paragraphs.

NOTE:

Make sure that the Num Lock and Caps Lock keys are activated. Convertible users should use the numbers across the top of the keyboard for arrow keys.

Channel Selection Menu

In this menu, only one option is available: "1 CHANNEL RADIO". To review or change the frequency, press the <Enter> key. The Channel Selection Screen will appear (Figure 3.1).

This example shows a transmitter codeplug programmed for 455.00000MHz. Note that only frequencies between 450.00000 and 470.00000 may be entered. Also, the frequency must be an integer multiple of 5.0 KHz or 6.25KHz. One exception is that a frequency of 0.0 may be entered to disable the transmitter or receiver.

To return to the Channel Selection Menu without changing the frequency, press the <Enter> key.

To change the frequency, type in the new frequency (in MHz) and press the key. If an invalid frequency is entered, the programmer will beep and then restore the original frequency to the display. If the entered frequency is valid, the programmer buffer is updated, and the display returns to the Channel Selection Menu

NOTE:

If the receive frequency is changed, then the receiver filters must be retuned. Additionally, if external duplex filtering is used and either the transmit or receive frequency is changed, then the duplexer must be re-aligned. Check the Radius R100 instruction manual for details.

Coded Squelch Menu

The Coded Squelch Menu will appear when selected from the Edit Menu (Figure 3.2). In this menu, five options are listed. As described earlier, the highlighted option is the option currently programmed in the programmer buffer. In the above example, the codeplug is programmed for PL Decode only. Not all options are applicable to both codeplugs. The "Decode Only" options may only be selected for a receiver codeplug, and the "Encode Only" options may only be selected for a transmitter codeplug. The "Omit Coded Squelch" option may be selected for either codeplug. To select an option, use the up/down arrows to move the cursor symbol ("< >") next to the desired option. Then press the <Enter> key. If an incompatible option is selected, the programmer will beep, and no action will be taken.

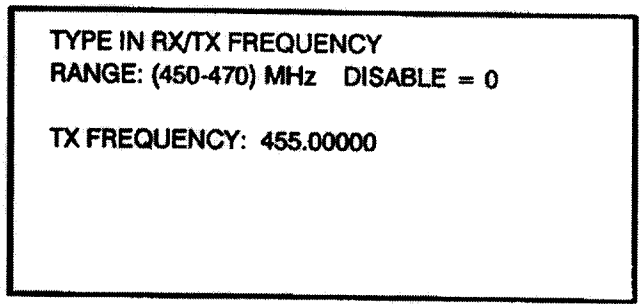

Figure 3.1

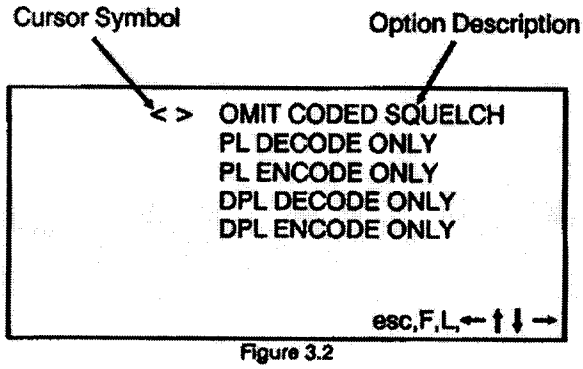

Figure 3.2

If any PL or DPL option is selected, the programmed PL or DPL code will be displayed for review or edit. To return to the Coded Squelch Menu without modifying the PL/DPL code, press the <Enter> key. Otherwise,type in the desired PL frequency or DPL code and press the <Enter> key. If the entered code is invalid, the programmer will beep and restore the original code to the display. The Coded Squelch Menu can not be re-entered until a valid PL/DPL code is entered. Note that entering a PL or DPL code of 0 is equivalent to selecting the "OMIT CODED SQUELCH" option. The display in Figure 3.3 appears when the "PL ENCODE ONLY" option is selected:

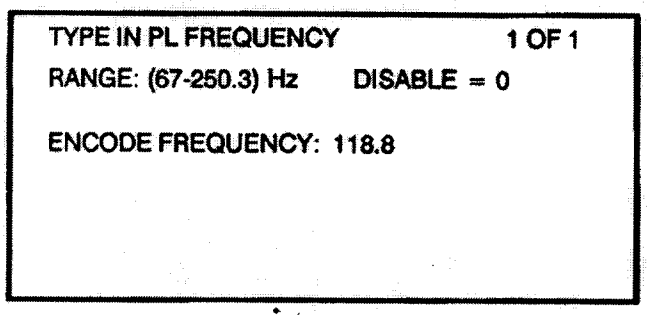

Figure 3.3

In this example, the codeplug is programmed for a transmit PL code of 118.8 Hz (PL 2B). When entering PL frequencies, if the entered frequency is within 1 1 Hz of a valid PL code, then the valid code is displayed. Note that the PL

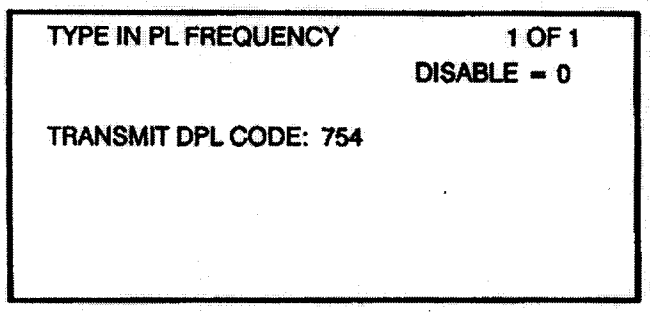

Figure 3.4

FREQUENCY , not ALPHANUMERIC CODE, must be entered.

The display in Figure 3.4 appears when selecting the "DPL ENCODE ONLY" option.

A DPL code of "999" is displayed when the data stored in the codeplug does not represent a valid DPL code. If this situation occurs (i.e. when changing from PL to DPL), enter a valid DPL code followed by the <Enter> key.

NOTE:

An R100 repeater can not be changed from PL to DPL coded squelch (or vice-versa) by simply reprogramming the codeplugs. Command board hardware changes are also required. If a PL/DPL squelch transition is attempted, the message in Figure 3.5 will be displayed:

If you want to proceed, contact Motorola Product Services (see page 12) for further information regarding Command Board changes.

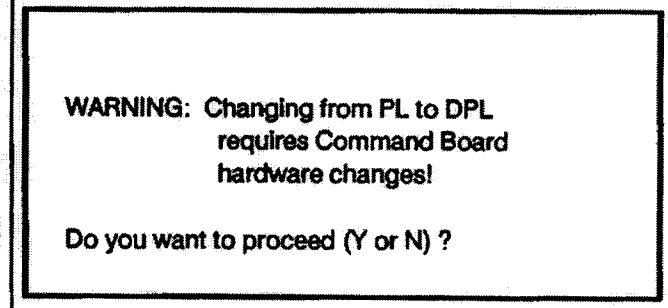

Figure 3.5

Time-Out-Timer Menu

Three time-out-timer options are available as shown in the Time- Out-Timer menu display (Figure 3.6).

As with the other Edit submenus, the highlighted option represents the one currently programmed. To select a different option, use the up/down arrows to move the "< >" cursor to the desired time-out function and press the <Enter> key. Since no time-out-timer is associated with the receiver, the

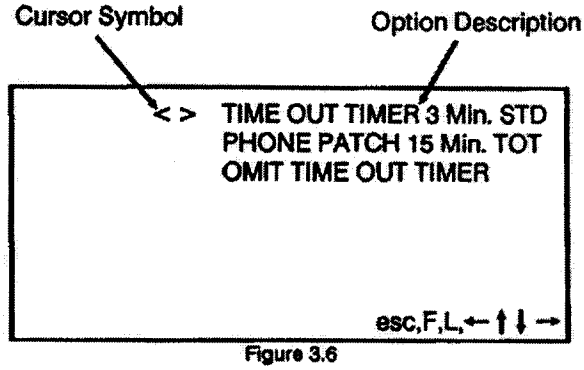

Figure 3.6

3 minute and 15 minute time-out-timer options are incompatible with the receiver codeplug.

NOTE:

If an optional phone patch (TDN7406 and L719) is present, a time- out value of 15 minutes (or L75, Omit Time-Out-Timer) is recommended. This choice will allow the phone patch to time-out before the station does.

After completion of editing the codeplug information is complete return to the Main Menu by using the <ESC> key. Then Write the new information into the Repeater's Codeplug.

List Option Key

The "L" key may be used to display or print the current codeplug parameters. This function may be invoked from any of the Edit submenus by pressing the "L" key. Then enter "D" to output the codeplug parameters to the display, or press "P" to output the listing to a printer attached to the LPT1: parallel port.

Select Special Function Key

As with the "L" function key, the "F" function key is also defined in all Edit submenus. To invoke a special function, press "F". Then enter one of the command letters defined as follows:

S: Duplicate the current codeplug data to an internal auxiliary buffer. The current buffer remains unchanged.

X: Exchange the current buffer with the auxiliary buffer. An exchange will only take place if the auxiliary buffer was previously loaded with valid data using the "S" special function key.

V: Verify the current codeplug data against the data stored in the auxiliary buffer. Any differences are reported.

M: Enter a hex monitor to examine/modify individual codeplug locations. WARNING: Do not use this function without a thorough knowledge of the codeplug format.

The "S", "X", & "V" special functions can be used to compare two different codeplugs by reading the first one into the programmer, "S"toring it, reading in the second codeplug, and "V"erifying the current and auxiliary buffers.